A Math and Science @ Work Special Series

CELEBRATING APOLLO

AP* HUMAN GEOGRAPHY Educator Edition

APOLLO-SOYUZ TEST PROJECT

Instructional Objectives

Students will

- analyze the change from competition to cooperation regarding space exploration between the United States and the Soviet Union; and
- identify and explain the centrifugal and centripetal forces involved in American-Soviet interactions during the Apollo era.

Preparatory Resources

There are no preparatory resources required for this problem. Additional information about the Apollo-Soyuz Test Project can be found at http://www.jsc.nasa.gov/history/astp.htm.

Background

This problem is part of a series of Social Studies problems celebrating the contributions of NASA's Apollo Program.

On May 25, 1961, President John F. Kennedy spoke before a special joint session of Congress and challenged the country to safely send and return an American to the Moon before the end of the decade. President Kennedy's vision for the three-year old National Aeronautics and Space Administration (NASA) motivated the United States to develop enormous technological capabilities and inspired the nation to reach new heights.

Eight years after Kennedy's speech, NASA's Apollo program successfully met the president's challenge. On July 20, 1969, the world witnessed one of the most astounding technological achievements in the 20th century. Neil Armstrong and Edwin "Buzz" Aldrin became the first humans to set foot on the Moon, while Mike Collins orbited the Moon in the Command Module. Armstrong's words, "That's one small step for [a] man, one giant leap for mankind," were heard around the world and inspired a generation. This amazing accomplishment required the collaboration of hundreds of thousands of determined individuals and the committed resources of our nation.

The successful launch of Sputnik I by the Soviets in the fall of 1958 initiated a technological competition between the United States and the Soviet Union; both nations wanted to prove their capability to reach the Moon. This

Grade Level
9-12

Key Topic
Political Geography

Degree of Difficulty
Moderate

Teacher Prep Time
1 hour

Problem Duration
Introduction/Discussion:
20 minutes
Free-Response Question:
25 minutes

AP Course Topics
- Political Organization of Space

NCGE Geography Standards
- Places and Regions
- Physical Systems
- Human Systems
- The Uses of Geography

competition began during the Cold War causing American fears that the technological advancements of the Soviets in space could also be used for military purposes. Despite being economically overshadowed by the United States, the Soviet Union continued its ominous presence in the space race.

The Apollo program began amidst this competition as NASA strived to meet Kennedy's goal. The program ran from 1961 to 1975 and set some major milestones in the history of human spaceflight. Apollo 8 was the first manned spacecraft to orbit a celestial body other than the Earth. Apollo 11 enabled the first human to set foot on the Moon. Apollo 17 marked the last lunar landing and the last human spaceflight mission beyond low-Earth orbit. The success of the Apollo program helped boost the confidence of Americans during a time of political turmoil.

In the late 1960's the United States and the Soviet Union both sought détente or a reduction in tension with each other. It was during this time, that the competition with the Soviets in space developed into a cooperative relationship. In 1967 both countries signed the Treaty on Peaceful Uses of Outer Space which banned weapons of mass destruction from orbiting satellites, celestial bodies, or outer space. In 1972 President Nixon and the Soviet leader, Breshnev met at the Moscow Summit signing the Anti-Ballistic Missile Treaty and the Strategic Arms Limitation Treaty. This involved agreements that included exchanges in science, technology, education and culture. The Apollo-Soyuz Test Project was a joint space effort that followed these agreements.

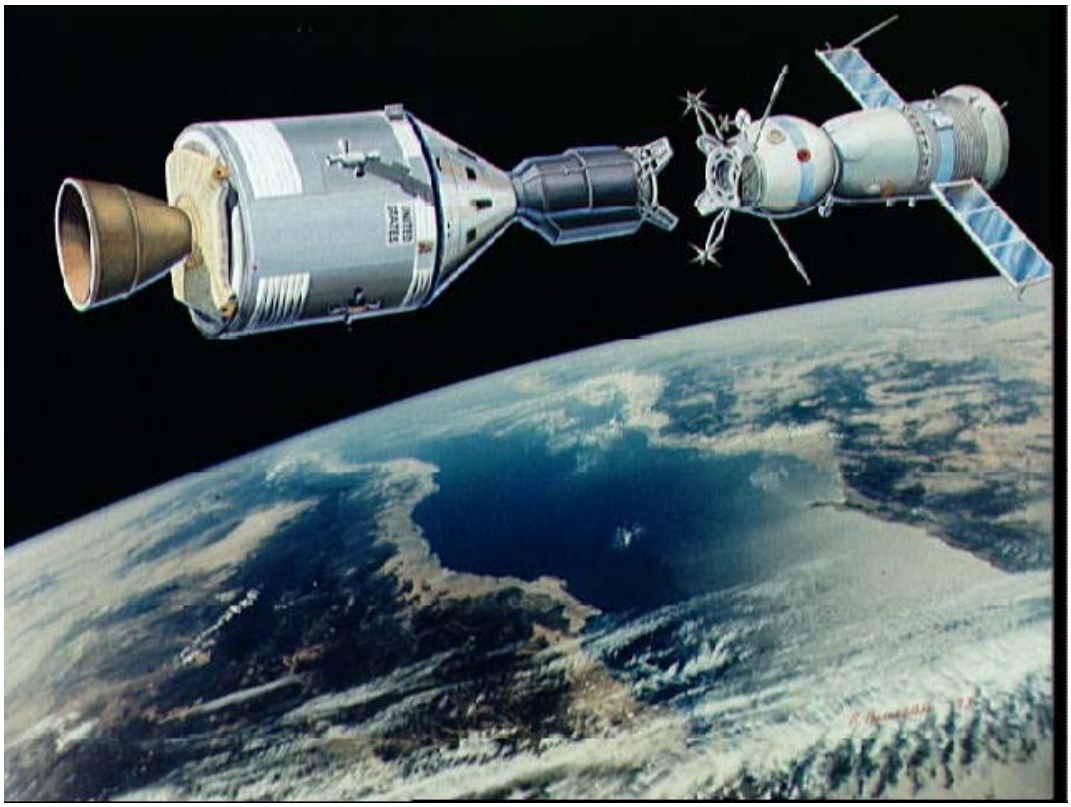

Figure 1: An artist's concept illustrating an Apollo-type spacecraft (on left) about to dock with a Soviet Soyuz-type spacecraft. An agreement between the United States and the Union of Soviet Socialist Republics provides for the docking in space of the Soyuz and Apollo-type spacecraft in Earth orbit in 1975.

This joint effort required three years of planning and preparation. American and Soviet crews spent a great deal of time together in formal mission training, getting to know each other, and learning about the other's culture. American astronauts visited Moscow and Soviet cosmonauts visited Houston as part of

the training. Despite the language barrier, differing technologies, and two different political systems, the development of the program progressed with relative ease. All differences were settled with negotiation and compromise.

On July 17, 1975, the world watched as the Russian Soyuz spacecraft and the U.S. Apollo spacecraft docked. Shortly after the Soyuz commander announced, "Soyuz and Apollo are shaking hands now,", the two Soviet crew members and three American crew members greeted each other with hand shakes. This joint space operation lasted for two full days. It was the final mission of the Apollo era and the first human spaceflight mission in which spacecrafts from two countries rendezvoused and docked in orbit.

Aside from its political significance, the Apollo-Soyuz Test Project resulted in a number of technological developments for both the United States and the Soviet Union. This shared experience opened a continuing collaboration between Russian and American scientists to provide a safer spaceflight environment for each country. This mission laid the ground work for all cooperative space efforts that would follow.

For more information about NASA's Apollo program visit www.nasa.gov.

AP Human Geography Course Goals

- Characterize and analyze changing interconnection among places
- Understand and interpret the implications of associations among phenomena in places

AP Course Topics

Political Organization of Space

- Territorial Dimensions of Politics
  - Influences of boundaries on identity, interaction, and exchange
- Changes in political-territorial arrangements
  - Fragmentation, unification, and alliance

NCGE Geography Standards

Places and Regions

- The physical and human characteristics of places
- How culture and experiences influences people's perspectives of places and regions

Human Systems

- The patterns and networks of economic interdependence on Earth's surface
- How the forces of cooperation and conflict among people influence the division and control of Earth's surface

The Uses of Geography

- How to apply geography to interpret the past

Free-Response Question

Directions

You have 25 minutes to answer all parts of the following question. While a formal essay is not required, it is not enough to answer a question by merely listing facts. Your answer should be based upon your critical analysis of the question posed. It is recommended that you spend 5 minutes of your allotted time to plan or outline your response. Make sure you letter each of your answers with the corresponding question.

Figure 2: Astronaut Donald K. Slayton and Cosmonaut Aleksey A. Leonov are seen together in the Soyuz Orbital Module during the joint U.S.-USSR Apollo-Soyuz Test Project docking in Earth orbit mission in July 1975.

Question

The relationship between the United States and the Soviet Union regarding space exploration changed quite drastically during the Apollo Era. It transitioned from one of competition during the early Apollo missions to one of cooperation during the Apollo-Soyuz Test Project. Using your knowledge of political geography and of the time period 1958 – 1975, analyze the interaction between the United States and the Soviet Union as it relates to space exploration.

Define and explain the following terms in your analysis.

A. Centrifugal forces

B. Centripetal forces

Scoring Guide:

Suggested 4 points total to be given.

Question		Distribution of points
A	*2 points*	1 point for defining centrifugal forces as an act or idea that promotes separation of people and ideas 1 point for explaining how centrifugal forces were evident during the early days of Apollo. The United States and the Soviet Union were competing in a race to space fostered by the political tensions due to the Cold War.
B	*2 points*	1 point for defining centripetal forces as an act or idea that encourages unification of people and ideas 1 point for explaining how the Apollo-Soyuz Test Project is an example of a centripetal force. The cooperation involved in the planning and preparation of this mission required negotiation and compromise by both countries. In addition, the Apollo-Soyuz Project's success was shared by U.S. and Soviet populations, despite strong political differences, thereby creating a sense of unification.

Contributors

Thanks to the subject matter experts for their contributions in developing this problem:

NASA Apollo Experts

NASA Johnson Space Center

Paul S. Hill
Director, Mission Operations

John O'Neill
Aerospace Operations Consultant
Retired from NASA as the Director of Space Operations in 1998

Frank Hughes
V.P. for Education & Training Products, Tietronix Software
Retired from NASA as Chief of Space Flight Training in 1999

John Jurgensen
Retired from NASA from the Shuttle Program Office in 2009

Historical Experts

NASA Johnson Space Center

Jennifer Ross-Nazzal, Ph.D.
Historian

University of Houston – Clear Lake

Shelly Henley Kelly, CA
University Archivist

Problem Development

Clear Creek Independent School District, TX

Jacob Clark
AP Human Geography Teacher
Clear Springs High School

NASA Johnson Space Center
Human Research Program Education and Outreach

Natalee Lloyd
Monica Trevathan
Trinesha Dixon
Traci Knight
Amanda E. Smith

Celebrating Apollo – Apollo-Soyuz Mission

Feedback Form

Please take a minute to complete this feedback form. Your input will help improve this product and will help us create new, useful material.

Fax the completed form to: (281) 461-9350 – Attention: Natalee Lloyd

Or type your responses in an email and send to: natalee.lloyd@tietronix.com

Please circle the appropriate response and include an explanation where desired.

1. This problem successfully accomplished the stated instructional objectives. YES NO

   _____

   _____

2. The problem was at an appropriate level of rigor to be used in an AP class. YES NO

   _____

   _____

3. The problem will help prepare students to answer free-response questions on the AP exam. YES NO

   _____

   _____

4. I will use this problem again. YES NO

   _____

   _____

5. Please provide suggestions for improvement of this problem and associated material:

   _____

   _____

   _____

Thank you for your participation.